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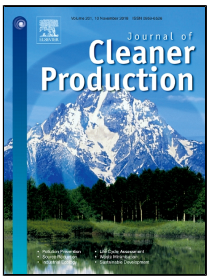

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Efficient removal of pesticides and heavy metals from wastewater and the antimicrobial activity of the synthesized *f*-MWCNTs/PVA nanocomposite film

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Abstract

In this work, we propose a method for preparation of cross-linked nanocomposite films of poly (vinyl alcohol) (PVA) incorporated with functionalized multiwall carbon nanotubes (*f*-MWCNTs) at different concentration. Due to poor water solubility of MWCNTs, poor surface chemistry, non-flexibility, and inability to form film composites by themselves, this limits their use in various applications. In order to improve their physical properties for providing better potentialities notably in environmental applications, their modification followed by mixing with PVA facilitates this process. This leads to gathering both material's advantages aiming at forming hydrophobic films able to capture heavy metals, pesticides, bacteria and fungi from wastewater with good recyclability. Citric acid as crosslinking agent was used to afford finally a powder form of *f*-MWCNTs/PVA which was directly converted to nanocomposite films via casting into Petri dish and drying at 60 ^{o}C. The obtained data displayed that the removal efficiency of heavy metals was augmented by increasing the concentration of *f*-MWCNTs to 8%.